

ENVIRONMENTAL ASSESSMENT

2008 Cooperative Gypsy Moth Project For Central and Southern Indiana

By

**Indiana Department of Natural Resources
Division of Entomology & Plant Pathology**

**Indiana Department of Natural Resources
Division of Forestry**

**United States Department of Agriculture
Animal and Plant Health Inspection Service**

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1.0 PURPOSE AND NEED FOR ACTION

1.1 Proposed Action

The Indiana Department of Natural Resources (IDNR), Division of Entomology & Plant Pathology and Division of Forestry, proposes a cooperative project with the United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS) to treat the gypsy moth populations at two different sites: one site in Delaware County and at one site in Scott County. The estimated project acreage is 1,085 acres (See table 1 & map in Appendix B). The preferred alternative for the cooperative project is Alternative 2: Btk.

Table 1. Treatment Sites and Acres by County and Treatment Method for 2008 (also see Appendix B).

COUNTY	TREATMENT SITES By Treatment Method		TREATMENT ACRES By Treatment Method	
	Mating Disruption	Btk Aerial	Mating Disruption	Btk Aerial
Delaware (Nebo)	0	1	0	525
Scott (Crothersville)	0	1	0	560
Cooperative Project by Treatment	0	2	0	1,085

1.2 Project Objective

The objective for this cooperative project is to eradicate gypsy moth by eliminating reproducing populations from the proposed treatment sites.

1.3 Need for Action

Gypsy moth is not native to the United States, and it lacks effective natural controls. The caterpillars feed on the foliage of many host plants. Oaks are the preferred host species, but the caterpillars defoliate many species of trees and shrubs when oaks are not available. When high numbers of gypsy moth caterpillars are present, forests and trees suffer severe defoliation, which can result in reduced tree growth, branch dieback and even tree mortality. The high numbers of caterpillars also create a substantial public nuisance and can affect human health.

The State of Indiana, with the IDNR, Division of Entomology and Plant Pathology as the lead agency, is dedicated to preserving urban and rural forested habitats from damage by gypsy moth and to enforcing interstate and intrastate quarantines to further protect areas not currently infested by this pest.

If no action is taken, gypsy moth will increase and spread and defoliation will occur sooner. Therefore, the "no action" alternative is not preferred due to state officials desire to eliminate

the isolated infestations, prevent human discomfort associated with infestations, delay damage to local plant communities and reduce spread to adjacent uninfested areas. Local citizens agreed that the “no action” alternative is not preferred through the scoping process (See Appendix A).

1.4 Decisions to be made and Responsible Officials

The preferred alternative in this document proposes cooperative participation of the IDNR and APHIS in treating gypsy moth populations in Indiana. The decision to be made by the responsible APHIS official is to choose which of the alternatives presented in this document best fulfills the objectives of the proposed action, and thus the needs of the people of Indiana. In addition, the decision will have to be made as to whether or not any perceived significant environmental impacts could result from the implementation of this project. If there are none, this will be documented in a Decision Notice and FONSI (Finding of No Significant Impact). If significant environmental impacts are found and the project is to continue, an Environmental Impact Statement (EIS) would be prepared.

The alternatives analyzed for this environmental assessment are: 1) No cooperative project (No action), 2) Btk, 3) Mating disruption, 4) Mass trapping.

The responsible APHIS official who will make this decision is:

Gary Simon, State Plant Health Director, USDA, Animal and Plant Health Inspection Service, 120 Professional Court Suite D, Lafayette, IN 47905, (765) 446-0267.

The responsible officials for the implementation of the cooperative project in the Indiana IDNR are:

Phil Marshall, Managing State Entomologist and Forest Health Specialist, Indiana Department of Natural Resources, Division of Entomology and Plant Pathology and Division of Forestry (respectfully), 402 West Washington Street, IGC South, Rooms W290/296, Indianapolis, IN 46201, (317) 232-4120.

John Seifert, State Forester, Indiana Department of Natural Resources, Division of Forestry, 402 West Washington Street, IGC South, Room W296, Indianapolis, IN 46204, (317) 232-4105.

1.5 Scope of the Analysis

A final environmental impact statement (FEIS), developed by the USDA, APHIS and Forest Service (USFS), entitled Gypsy Moth Management in the United States: a cooperative approach (USDA 1995) was made available in November 1995. The Record of Decision for the FEIS was signed in January of 1996 (USDA 1996), and Alternative 6 was selected, which includes all three management strategies analyzed – suppression, eradication, and slow-the-spread. These strategies depend upon the infestation status of the area: generally infested, uninfested, and transition. Implementation of the FEIS preferred alternative requires that a site-specific environmental analysis be conducted to address local issues before federal or

cooperative projects are conducted. This site-specific analysis is tiered to the programmatic environmental impact statement (USDA 1995). As part of the analyses conducted for the FEIS, human health and ecological risk assessments were prepared (Human Health Risk Assessment, Appendix F to the FEIS and Ecological Risk Assessment, Appendix G to the FEIS). The purpose of tiering is to eliminate repetitive discussions of the issues addressed in the FEIS (40 CFR, 1502.20 and 1508.28 in Council on Environmental Quality, 1992).

1.6 Summary of Public Involvement and Notification

Two public meetings were held during January 2008 (Appendix A). Notices were delivered to elected officials, interested groups, residents and local media. At the meeting, state officials presented alternatives for gypsy moth management. The discussion included identification and biology of gypsy moth, pest impacts, survey methods, and control tactics. The proposed actions and alternatives, including no action, were discussed. Local issues, questions and concerns raised at the public meetings are included in Appendix A.

Information gathered at the public meeting and from resource professionals was used to develop issues and concerns related to the project. They are grouped into two categories; 1) issues used to formulate alternatives, and 2) other issues and concerns.

1.7 Issues Used to Formulate the Alternatives

Each of the major issues is introduced in this section. Discussion pertaining directly to each issue as it relates to the alternatives can be found in Chapter 4.

Issue 1 - Human Health and Safety. Three types of risk are addressed under this issue: 1) an aircraft accident during applications, 2) treatment materials and potential effects on people, and 3) the future effects of gypsy moth infestations on people.

Issue 2 - Effects on Non target Organisms and Environmental Quality. The major concerns under this issue are: 1) the impact of treatment materials to non target organisms, including threatened and endangered species that may be in the treatment sites, and 2) the future impacts of gypsy moth defoliation on the forest resources, water quality, wildlife and other natural resources.

Issue 3 - Economic and Political Impacts of Treatment vs. Non-Treatment. Gypsy moth outbreaks can have significant economic impacts due to effects on the timber resource, nursery and Christmas tree producers, and recreational activities. An additional economic impact is a gypsy moth quarantine imposed to regulate movement of products from the forest, nursery and recreational industries to uninfested areas.

Issue 4 - Likelihood of Success of the Project. The objective of this project is to eradicate gypsy moth from the proposed treatment sites. Alternatives vary in their likelihood of success for the current situation in Indiana. Measurement of project success is important for delaying gypsy moth impacts to Indiana and neighboring states.

1.8 Other Concerns and Questions

Concerns and questions were discussed during the public meetings (see Appendix A). Also, other agencies were consulted (see Appendix C). Information from these sources was used to develop mitigating measures, management requirements and constraints.

1.9 Summary of Authorizing Laws and Policies

State. The Division Director (State Entomologist) may cooperate with a person in Indiana to locate, check, or eradicate a pest or pathogen (Indiana Code 14-24-2-1). The Division Director may, on the behalf of the department, enter into a cooperative agreement with the United States government, the government of another state, or an agency of the United States or another state to carry out this article (Indiana Code 14-24-2-2). Aerial applicators must meet Indiana Pesticide Use and Application Law (Indiana Code 15-3-3.6) to provide safe, efficient and acceptable applications of pesticides. The Non-Game and Endangered Species Conservation law (Indiana Code 14-22-34) applies to this project.

Federal. Authorization to conduct treatments for gypsy moth infestations is given in the Plant Protection Act of 2000 (7 U.S.C. section 7701 et.seq.).

The Cooperative Forestry Assistance Act of 1978 provides the authority for the USDA and state cooperation in management of forest insects and diseases. The law recognizes that the nation's capacity to produce renewable forest resources is significantly dependent on non-federal forestland. The 2002 Farm Bill (P.L. 107-171d.) reauthorizes the basic charter of the Cooperative Forestry Assistance Act of 1978.

The National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190), 42 USC 4321 et.seq. requires a detailed environmental analysis of any proposed federal action that may affect the human environment. The courts regard federally funded state actions as federal actions.

The Federal Insecticide, Fungicide and Rodenticide Act of 1947, (7 USC 136) as amended, known as FIFRA, requires insecticides used within the United States be registered by the United States Environmental Protection Agency (EPA).

Section 7 of the Endangered Species Act prohibits federal actions from jeopardizing the continued existence of federally listed threatened or endangered species or adversely affecting critical habitat of such species.

Section 106 of the National Historical Preservation Act and 36 CFR Part 800: Protection of Historic Properties requires the State Historic Preservation Officer be consulted regarding the proposed activities.

USDA Departmental Gypsy Moth Policy (USDA 1990) assigns the USFS and APHIS responsibility to assist states in protecting non-federal lands from gypsy moth damage.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Process Used to Formulate the Alternatives

Staff entomologists and administration within the IDNR, Division of Entomology and Plant Pathology and the Division of Forestry in cooperation with USDA-APHIS, formulated several alternatives to treat the gypsy moth populations in Indiana under the eradication strategy (See Chapter 6, Persons and Agencies Consulted).

The FEIS (USDA 1995), which this document is tiered to, allows the USDA to participate in the Cooperative Gypsy Moth Project for Indiana. The USDA can assist in conducting eradication, slow-the-spread and suppression strategies. The FEIS lists the treatment options for each of the strategies (USDA 1995, Vol. II, p.2-15). For the eradication strategy, the following six treatment options may be considered: 1) *Bacillus thuringiensis* var. *kurstaki* (Btk), 2) diflubenzuron (Dimilin), 3) nucleopolyhedrosis virus (Gypchek), 4) mass trapping, 5) mating disruption (pheromone flakes), and 6) sterile insect release. These treatment options from the FEIS were used as the alternatives for the site-specific analysis of this Environmental Assessment.

2.2 Alternatives Eliminated from Detailed Study

The following alternatives that are available were eliminated from consideration:

Diflubenzuron (Dimilin). The label for diflubenzuron (Dimilin) prohibits its use directly to water, or to areas where surface water is present. One proposed treatment site contains a creek and ditch areas that periodically may contain water and the other proposed treatment site contains a river and associated bottomland that periodically floods. Therefore, its use was not considered for this project. This does not preclude the consideration and use of Dimilin in future projects.

Gypsy moth specific nucleopolyhedrosis virus (Gypchek). Gypsy moth nucleopolyhedrosis virus (Gypchek) has a very limited supply and is targeted for use in special areas that have high environmental concerns. There are limited data on the effectiveness of Gypchek in low-level gypsy moth populations. It is preferably used in suppression projects against moderate to high gypsy moth populations (USDA 1995, Vol. II, p. A7). Therefore, NPV is not considered for this project. In future projects, it will be evaluated for use.

Sterile insect release. The FEIS documents the use of sterile insects for elimination of isolated gypsy moth populations. It also documents the obstacles of using this alternative - the limited release period; need to synchronize production of sterile pupae and release into the population; and the limited availability. This treatment alternative is currently not available, and it has not been used in recent eradication or Slow-The-Spread treatment projects. Giving consideration to these obstacles, this alternative was not considered for this project. In future projects, it will be evaluated for use.

2.3 Alternatives Considered in Detail

Alternative 1 - No action. If no action is taken, the gypsy moth will reproduce and populations will begin to defoliate trees in the area. Gypsy moth populations will develop and spread to surrounding areas. This is not a preferred alternative because damage and regulatory action will occur sooner than if other alternatives are selected.

Alternative 2 – Btk (Preferred Alternative). This treatment option uses up to three applications of Btk at 24 to 38 billion international units (BIU) per acre applied from air or ground. The applications would begin when leaf expansion is near 50% and when first and second instar caterpillars are present and feeding. This usually occurs between mid April and mid May in southern and central Indiana. The second application would follow no sooner than four days after the first application. Most commercial formulations of Btk are aqueous flowable suspension containing 48 or 76 BIU/gal. (Appendix D – example of product label). For aerial application at 24 to 38 BIU, less than 3.0 quarts of the product would be applied per acre.

Btk has been a commonly used treatment option in Cooperative Gypsy Moth Projects in Indiana and other states. Btk is a naturally occurring soil-borne bacterium that is mass-produced and formulated into a commercial insecticide. The Btk strain is effective against caterpillars, including the gypsy moth caterpillar. Caterpillars ingest Btk while eating the foliage. Once in the midgut, Btk becomes active and causes death within a few hours or days (USDA 1995, Vol. II, p. A3-A5). Btk may impact nontarget species of spring-feeding caterpillars in the treatment sites, but the impact to the local population is usually very minimal as Btk rapidly degrades on the foliage within a few weeks, and the nontarget lepidopterans generally re-colonize treatment sites in less than 2 years (USDA 1995, Vol. II, p. 4-52 to 4-55). Human exposure to Btk provides little cause for concern, though direct exposure to the spray may cause temporary eye, skin and respiratory tract irritation in a few people (Thomas and Durkin, 2004) (USDA 1995, Vol. II, p. 4-13). In addition, the USDA reports “Specifically, there is little indication that B.t.k. is associated with pathogenicity in humans and no indication of endocrine disruption or reproductive effects in humans after exposure to B.t.k. formulations. In addition, carcinogenic and mutagenic effects are not likely to result from exposure to B.t.k. or its formulations. The potential for allergenicity of B.t.k. is somewhat more difficult to assess” (Thomas and Durkin, 2004). Btk has proven effective at eliminating gypsy moth at low population levels. Btk applications can meet the project objective of eliminating gypsy moth populations from the proposed treatment sites.

Alternative 3 - Mating disruption. This treatment option uses one aerial application of pheromone flakes prior to the emergence of male moths. This would occur in mid-June to early July. Mating disruption relies on the attractive characteristics of the gypsy moth sex pheromone, disparlure. The objective of mating disruption is to saturate the treatment area with enough pheromone sources to confuse the male moths and prevent them from finding and mating with female moths. Mating disruption is considered specific to gypsy moth and is not known to cause impacts to nontarget organism populations, water quality, microclimate, or soil productivity and fertility (USDA 1995, Vol. II, p. 4-67).

Mating disruption involves the aerial application of plastic flake dispensers that are impregnated with the gypsy moth pheromone. The formulation of Disrupt II (see Appendix D – example of product labels) consists of small plastic flakes, approximately 1/32 inch x 3/32 inch (1 x 3 mm) in size, thus the name “pheromone flakes”. A sticker, Monsanto's Gelva 2333, is applied to the flakes as they are dispersed from the aircraft, which aids in the distribution of the flakes throughout all levels in the forest canopy where mating could potentially occur. The flakes are green in color and applied at a rate of 6 or 15 grams active ingredient (disparlure) per acre. At the high rate of 15 grams, 85 grams of flakes are applied in 4 fluid ounces of sticker per acre (4 flakes per sq.ft.) (Thorpe et al. 2006). All of the ingredients in the Gelva 2333 sticker are considered non-hazardous to public health if used as an additive in the insecticide formulation (40 CFR 180.1001).

Pheromone flakes have proven effective at eliminating gypsy moth at very low population levels. The application of pheromone flakes can not meet the project objective of eliminating gypsy moth populations from the proposed treatment sites as the sites have a low population level of gypsy moth.

Alternative 4 - Mass trapping. This treatment option places gypsy moth traps at a close spacing within the treatment sites. “The objective of this treatment is to capture male gypsy moths before they have a chance to locate and mate with female moths” (USDA 1995, Vol II, p. A-7). “For mass trapping, delta or milk carton traps are deployed in an intensive grid pattern in an infested area and an adjacent buffer area at the rate of at least 9 traps per acre” (USDA 1995, Vol. II, p. A-8). Thus, it is very labor intensive, especially over large areas. Typically, mass trapping is used on small infestations of less than 40 acres.

Mass trapping has proven capable of eradicating gypsy moth at very low population levels in isolated introductions that are small in size (<40 acres). The use of mass trapping can not meet the project objective of eliminating the gypsy moth population from the proposed treatment sites as the sites are >40 acres and there is a low level population.

2.4 Comparative Summary of Alternatives

Table 2. Summary of Environmental Consequences for Alternatives by Issues from Chapter 4

	Issue 1 Human Health & Safety (pgs. 12-13)	Issue 2 Effects on Nontarget Organisms & Environmental Quality (pgs. 13-15)	Issue 3 Economic and Political Impacts (pgs. 15-16)	Issue 4 Likelihood of Success of the Project (p. 16)
Alternative 1 No action	<ul style="list-style-type: none"> - No risk of an aircraft accident or spill. - No risk of Btk contact with humans. - Gypsy moth outbreaks will occur sooner with the associated nuisance and health impacts to humans. 	<ul style="list-style-type: none"> - No direct effect to nontarget organisms, including threatened and endangered species. - Future gypsy moth impacts will occur sooner, which includes defoliation and reduction in the oak component of forest stands. 	<ul style="list-style-type: none"> - Regulatory action would occur sooner. - Spread of gypsy moth through the county and into adjacent counties would not be slowed. 	<ul style="list-style-type: none"> - Gypsy moth would not be eliminated from treatment sites and project objective would not be met.
Alternative 2 Btk	<ul style="list-style-type: none"> - Slight risk of aircraft accident and pesticide spill. - Contact with Btk may cause mild and temporary irritation (eye, skin & respiratory) to a few people. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - Direct impact on spring feeding caterpillars, temporary reduction in local populations. - No effect to Karner blue butterfly and Mitchell's satyr butterfly as neither species occur in or near treatment site. - Adverse effect on Indiana Bat is unlikely. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not likely be implemented in the county during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is likely in the treatment site.
Alternative 3 Mating disruption	<ul style="list-style-type: none"> - Slight risk of aircraft accident. - No effect to human health. - Delay effect of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No effect to non target organisms, including threatened and endangered species. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in the county during the current year. - Slows the spread of gypsy moth. 	<ul style="list-style-type: none"> - Success is not likely in the treatment site because of a low level population
Alternative 4 Mass trapping	<ul style="list-style-type: none"> - No risk of aircraft accident or spill. - No risk of Btk contact with humans - No effect to human health - Delay effects of gypsy moth outbreaks on humans. 	<ul style="list-style-type: none"> - No effect to non target organisms, including threatened and endangered species. - Delay the impact of gypsy moth defoliation on environmental quality. 	<ul style="list-style-type: none"> - Regulatory action would not be implemented in the county during the current year. - Slows the spread of gypsy moth. - Cost is prohibitive in large treatment sites. 	<ul style="list-style-type: none"> - Success is not likely in the treatment site because of low level population.

3.0 AFFECTED ENVIRONMENT

3.1 Description of the Proposed Treatment Sites

Delaware County: There are approximately 263,600 acres in Delaware County and approximately 13,200 acres of forest that contain both favorable and unfavorable host species.

Nebo: The proposed treatment site contains 525 acres. The site is primarily urban forests and trees associated with urban residential areas and adjacent farmland. The forest contains oak, hickory, maple, ash, conifers, shrubs and other hardwoods. Houses are within the site and there is an electrical substation and radio tower adjacent to the site. The site was detected in 2006 and treated with Btk in 2007. Survey detected egg masses. The survey indicates a low level gypsy moth population, and Btk is proposed for the site because the population is above the threshold for application of mating disruption and mass trapping.

Scott County: There are approximately 123,400 acres in Scott County and 47,000 acres of forest that contain both favorable and unfavorable host species.

Crothersville: The proposed treatment site contains 560 acres. The site is forest land and trees associated with rural residences and farmland. The forest contains oak, hickory, beech, maple, yellow poplar and other hardwoods. The site was detected in 2002, delimited in 2003, treated in 2004 with mating disruption, delimited in 2005, treated in 2006 with Btk and delimited in 2007. The 2007 surveys detected egg masses and moths. The surveys indicate a low gypsy moth population, and Btk is proposed for the site because the population is above the threshold for application of mating disruption and mass trapping.

3.2 Threatened and Endangered Species

Consultation with the staff of the U.S. Fish and Wildlife Service determined that neither of the federally endangered species Karner blue butterfly (*Lycaeides melissa samuelis*) and Mitchell's satyr butterfly (*Neonympha mitchellii*) are known to occur within or adjacent to the sites proposed for treatment using Btk. (Appendix C – U.S. Fish & Wildlife Letter).

The proposed treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*). The U.S. Fish & Wildlife indicates, "None of the proposed treatment areas are near Indiana bat hibernacula. All of the 2008 Btk aerial treatment sites are limited to relatively small areas of Indiana bat summer habitat, Therefore the FWS concludes that the federally assisted 2008 gypsy moth program is not likely to adversely affect any of these federally listed species." (Appendix C – U.S. Fish & Wildlife Letter).

The IDNR, Environmental Unit reviewed the project and stated, "At this time, no harm to state or federal listed species resulting from the proposed control measures is known or anticipated. The potential harm from the project is less than the potential harm to these same

species from an uncontrolled gypsy moth infestation.” (Appendix C – IDNR Letter, Early Coordination/Environmental Assessment).

3.3 Protection of Historic Properties

The State Historic Preservation Officer analyzed the proposed project and determined that no historic properties will be altered, demolished, or removed by the proposed project. (Appendix C –IDNR Letter, Division of Historic Preservation and Archaeology).

4.0 ENVIRONMENTAL CONSEQUENCES

This section is the scientific and analytic basis for the comparison of alternatives. It describes the probable consequences (effects) of each alternative for each issue. Environmental consequences are summarized in Table 2 for each combination of the alternatives and issues.

4.1 Human Health and Safety (Issue 1).

Alternative 1 – No action. For this alternative, there would be no cooperative project, therefore risk of human contact with pheromone flakes or Btk and an aircraft accident during application would not exist. However, future impacts by gypsy moth to human health will occur sooner under Alternative 1 than if treatments are used to eliminate the gypsy moth populations. Gypsy moth outbreaks have been associated with adverse human health effects, including skin lesions, eye irritation, and respiratory reactions. Gypsy moth caterpillars can become a serious nuisance that can cause psychological stress in some individuals (USDA 1995, Vol. II, p. 4-9).

Alternative 2 - Btk. Human exposure to Btk provides little cause for concern, though direct exposure to the spray may cause temporary eye, skin and respiratory tract irritation in a few people (Thomas and Durkin, 2004) (USDA 1995, Vol. II, p. 4-13). In addition, the USDA reports “Specifically, there is little indication that B.t.k. is associated with pathogenicity in humans and no indication of endocrine disruption or reproductive effects in humans after exposure to B.t.k. formulations. In addition, carcinogenic and mutagenic effects are not likely to result from exposure to B.t.k. or its formulations. The potential for allergenicity of B.t.k. is somewhat more difficult to assess” (Thomas and Durkin, 2004). “B.t.k. applications to control or eradicate the gypsy moth are not expected to cause serious adverse health effects in humans”(Thomas and Durkin, 2004). A comprehensive review of *Bacillus thuringiensis* var. *kurstaki* (B.t.k.) and the assessment on human health and ecological risks was completed in 2004 (Thomas and Durkin, 2004). Also, a detailed analysis of the risks posed to humans by Btk was conducted for the FEIS -- Human Health Risk Assessment (USDA 1995, Vol. III).

A slight risk of an accident always exists when conducting aerial applications – Btk uses up to three applications. To further reduce this risk, a detailed work and safety plan is required prior to program implementation, which outlines guidelines for aircraft inspections, Btk loading, and conditions for safe applications. The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 3 – Mating disruption. The toxicity of insect pheromones to mammals is relatively low and their activity is target-specific. Therefore the EPA requires less rigorous testing of these products than of conventional insecticides. Risk to human health due to exposure to disparlure, the active ingredient in pheromone flakes, is discussed in the FEIS (USDA 1995, Vol. II, pp. 4-30 to 4-32). Once absorbed through direct contact, disparlure is very persistent in humans, and individuals exposed to disparlure may attract adult male moths for prolonged periods of time. This persistence is viewed as a nuisance and not a

health risk (USDA 1995, Vol. III, 8-1). In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5) therefore no effects to human health are anticipated.

A slight risk of an accident always exists when conducting aerial applications – mating disruption uses one application. To further reduce this risk, a detailed work and safety plan is required prior to program implementation, which outlines guidelines for aircraft inspections, pheromone flake loading, and conditions for safe applications. The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

Alternative 4 – Mass trapping. The human health effects are not anticipated from the use of disparlure in the delta traps (see Alternative 3 above). The effect of gypsy moth outbreaks on humans would be delayed using this alternative.

4.2 Effects on Non target Organisms and Environmental Quality (Issue 2).

Alternative 1 – No action. With no treatments in the current year, future impacts by the gypsy moth would occur sooner. Defoliation by the gypsy moth will cause selective mortality of preferred host trees. During outbreaks, forest ecosystems can change due to a reduction of the oak component and an increase of tree species that are less desired by gypsy moth, such as maple and ash. Oak forests would likely consist of a more mixed composition in the future; though oak would still be a component.

Gypsy moth defoliation and subsequent tree mortality can affect non target organisms by dramatically changing habitats on a local scale. Heavy defoliation can remove food for other leaf-feeding species, including other caterpillars. However, it can also create new habitat for some species by creating snags and increasing understory plant development by increasing light penetration into defoliated areas. Impacts on a larger scale (national, regional, or state) are subtle, gradual, and may be noticeable only after many years or decades (USDA 1995, Vol. II, p. 4-74). Short- and long-term changes in non target species have been shown for moderate and heavy defoliation (USDA 1995, Vol. II, p. 4-47 and 4-50). An Ecological Risk Assessment (USDA 1995, Vol. IV) examined gypsy moth impacts on a wide variety of species (mammals, birds, reptiles, amphibians, fish, insects, mollusks, crustaceans, and other invertebrates). Further discussion of gypsy moth and its impact on forest conditions can be found in the FEIS (USDA 1995, Vol. II, p. 4- 41 and 4-74).

Alternative 2 - Btk. Btk can have direct and indirect effects on non target organisms. Direct toxicity of Btk is generally limited to the larval stage of moth and butterfly species. Btk has a direct adverse effect on caterpillars of moths and butterflies, but susceptibility varies widely among species and the larval stage of those species present during treatment (Thomas and Durkin, 2004) (USDA 1995). Btk, as used in gypsy moth projects, poses a risk to some spring-feeding caterpillars; however, permanent changes in their populations do not appear likely. An exception may occur in certain habitats that support small isolated populations of a particular species of moth or butterfly that is highly susceptible to Btk (USDA 1995, Vol. II, p. 4-54). Adverse effects for terrestrial mammals, fish and aquatic invertebrates appear to be unlikely. "...effects in birds, plants, soil microorganisms, or soil

invertebrates other than insects are not of plausible concern” (Thomas and Durkin, 2004). The U.S. Fish and Wildlife Service identified two federally endangered species of butterflies – the Karner blue butterfly (*Lycaeides melissa samuelis*) and the Mitchell’s satyr butterfly (*Neonympha mitchellii*). However, these species are not known to occur within or adjacent to the treatment sites (Appendix C - U.S. Fish & Wildlife Letter). Thus, no potential exists for Btk to affect these populations.

Btk may have an indirect effect on other organisms by a reduction in their food resource (e.g. caterpillars, pupae, or adult moths and butterflies). Any effects on vertebrates due to reduction in food availability are probably subtle, especially for mammals and birds that are very mobile. Populations of some gypsy moth parasites and some general lepidopteran parasites may be reduced, due to the reduction in number of potential hosts caused by the Btk spray (USDA 1995, Vol. IV, p. 5-7). The U.S. Fish and Wildlife letter identified that the treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*). The FWS indicates, “None of the proposed treatment areas are near Indiana bat hibernacula. All of the 2008 Btk aerial treatment sites are limited to relatively small areas of Indiana bat summer habitat, Therefore the FWS concludes that the federally assisted 2008 gypsy moth program is not likely to adversely affect any of these federally listed species.” (Appendix C – U.S. Fish & Wildlife Letter).

Applications of Btk formulations do not increase levels of Btk in soil, and Btk persists for a relatively short time in the environment. Changes in soil productivity and fertility are not likely in the proposed treatment sites, because Btk occurs naturally in soils worldwide. Additional information concerning the effects to soil can be found in Appendix G of the FEIS (USDA 1995, Vol. IV).

Application of Btk is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the proposed treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in the county; even if this alternative is implemented.

Alternative 3 – Mating disruption. The pheromone in the flake dispenser is specific to gypsy moth, and it will not affect other insects, including any threatened and endangered species of butterflies or moths.

A quantitative assessment of risk from mating disruption was not conducted for the FEIS because of disparlure’s low toxicity to vertebrates and specificity to gypsy moth. As used in mating disruption, disparlure is not likely to impact nontarget organisms (USDA 1995, Vol. II, p. 4-67). The toxicity of insect pheromones to mammals is relatively low. In acute toxicity tests, disparlure was not toxic to mammals, birds, or fish (USDA 1995, Vol. IV, 5-5). At normal application rates, concentration of the pheromone (disparlure) impregnated in the flakes remains active for one season only. Therefore, no effects on non target organisms are anticipated from the proposed Disrupt II application.

Most ingredients in the flakes are insoluble in water, so the risk of disparlure leaching into groundwater is minimal. To determine the amount of disparlure that could potentially leach

into water, 50 grams of flakes were submerged in 150 ml of water and vigorously agitated for 24 hours. Results indicate that less than 0.04% of the active ingredient (disparlure) contained in the flakes leached into water under these conditions. Disrupt II is applied at doses of 6 or 15grams of active ingredient (disparlure) per acre and 90% of the flakes are intercepted by and adhere to the forest canopy, where they remain until they have released most of the disparlure.

Using pheromone flakes to disrupt mating is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the proposed treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in the county; even if this alternative is implemented.

Alternative 4 - Mass trapping. The pheromone in the delta trap is specific to gypsy moth and will not have an effect on other insects or threatened and endangered species of butterflies or moths. “Mass trapping does not affect non target organisms, except those (primarily flying insects) that accidentally find their way into the trap.” (USDA 1995, Vol. II, p. A-9).

Mass trapping is likely to maintain the forest condition in the short-term by eliminating gypsy moth populations in the proposed treatment sites, thus delaying gypsy moth from expanding and causing defoliation. In the long-term, gypsy moth will become well established in the county; even if this alternative is implemented.

4.3 Economic and Political Impacts of Treatment vs. Non-Treatment (Issue 3).

Alternative 1 – No action. If no treatments were applied, the likely action would be to implement a quarantine in the counties during the next year. A quarantine would regulate movement of firewood, logs, other timber products, mobile homes, recreational vehicles, trees, shrubs, Christmas trees, and outdoor household articles. This would create a financial impact to industries that deal with these products.

If current populations are not treated, they will continue to reproduce and grow in size. Defoliation would become noticeable in the future, but it would be difficult to predict exactly when noticeable defoliation would occur. Requests for federal assistance to suppress gypsy moth would be likely when defoliation occurs. Suppression projects are generally more expensive in total dollars than eradication projects because much larger areas are treated. The economic impact to state budgets would increase, as responsible agencies would need to administer and fund these suppression projects.

Following defoliation, negative financial impacts are likely to occur for recreational industries such as resorts and campgrounds. Homeowners, private woodland owners, and forest-based industries could be impacted by gypsy moth treatment costs, tree mortality, and adverse human health effects.

Alternatives 2 (Btk). If treatments are applied, regulatory action is not likely for the counties during the next year and the impacts listed under Alternative 1 would be delayed.

Alternatives 3 (Mating disruption). If treatments are applied, regulatory action is not likely for the counties during the next year and the impacts listed under Alternative 1 would be delayed.

Alternative 4 – Mass trapping. If treatments are applied, regulatory action is not likely for the counties during the next year and the impacts listed under Alternative 1 would be delayed. Mass trapping is typically used in small areas (less than 40 acres) because it is labor intensive (USDA 1995, Vol. II, p. A8-9). Its use for the proposed treatment sites would be cost prohibitive.

4.4 Likelihood of Success of the Project (Issue 4).

Alternative 1 – No action. Project objectives would not be met with this alternative. Gypsy moth would not be eliminated from the proposed treatment sites, and its population would serve as a source for increased spread within the two proposed treatment site counties and into surrounding counties. If the populations were allowed to increase and expand, gypsy moth could spread through the remainder of the state in <10 years (Sharov et al. 2002).

Alternative 2 - Btk. Project success is likely with this alternative. Btk is effective in eliminating gypsy moth in treatment sites with low gypsy moth populations.

Alternative 3 – Mating disruption. Project success is likely with this alternative in sites with very low population levels. However, these sites have a low gypsy moth population level and an application of pheromone flakes cannot meet the objective of eliminating the population from the proposed treatment sites.

Alternative 4 – Mass trapping. Project success is likely with this alternative in sites with very low population levels. However, these sites have a low gypsy moth population level. Mass trapping is a labor-intensive treatment and sites greater than 40 acres are usually not mass trapped. Mass trapping these sites would be cost prohibitive.

4.5 Unavoidable Adverse Effects

No unavoidable adverse effects were identified for the proposed project.

4.6 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of resources results in the permanent loss of: 1) nonrenewable resources, such as minerals or cultural resources; 2) resources that are renewable only over long periods of time, such as soil productivity; or 3) a species (extinction) (USDA 1995, Vol. II, p. 4-93). Except for Alternative 1, there is an irreversible commitment of labor, fossil fuel, and money spent on the project.

An irretrievable commitment is one in which a resource product or use is lost for a period of time while managing for another (USDA 1995, Vol. II, p. 4-93). For this project, no irretrievable commitments were identified.

4.7 Cumulative Effects

Cumulative effects are the incremental impacts of the action when added to past, present, and reasonably foreseeable future actions that collectively are significant. No cumulative effects were identified for this proposed project. It is reasonably foreseeable that these sites may be treated in the future. Cumulative effects of any future treatments will be examined under future environmental assessments prior to treatment.

Both proposed treatment sites for 2008 have had treatments in previous years. Part of the Nebo site (Delaware County) was treated in 2007 with Btk and portions of the Crothersville site (Scott County) were treated in 2004 with mating disruption and in 2006 with Btk.

Cumulative effects from Btk applications over several years are not anticipated because the treatment sites are generally less than 1000 acres and similar habitats are nearby which have not been treated; thus treatment sites are likely to be recolonized rapidly (USDA, 1995, Vol. II, p. 4-89 to 4-91). No cumulative effects of the prior treatments are anticipated.

4.8 Other Information

Mitigation

The Cooperative Gypsy Moth Project will implement the following safeguards and mitigating measures:

- News releases of treatments and dates will be given to local newspapers and radio/TV
- Local safety authority will be notified by direct contact or phone calls.
- Employees of state and federal agencies monitoring the treatment will receive training on treatment methods to be able to answer questions from the public.
- Application of Btk will be suspended when school buses are in the site and when children are outside on school grounds.
- Aircraft will be calibrated and characterized for accurate application of treatment material.
- Applications will be timed so the most susceptible gypsy moth stage is targeted.
- Weather will be monitored during treatment to assure accurate deposition of the treatment material.

Monitoring

During the treatments, ground observers and/or aerial observers will monitor the application for accuracy within the treatment site perimeters, swath width, and drift. Application information (e.g. swath widths, spray-on and spray-off, acres treated, and altitude) will be downloaded to an operations-base computer. The treatment site will be monitored using gypsy moth traps to determine the effectiveness of the treatments.

5.0 LIST OF PREPARERS

Phil Marshall, Managing State Entomologist and Forest Health Specialist, Division of Entomology and Plant Pathology and Division of Forestry (respectfully), Indiana Department of Natural Resources, 402 W. Washington Street, Room 290/296W, Indianapolis, IN 46204.

EA Responsibility: Participated in writing and reviewing the environmental assessment and in the development of the proposed cooperative gypsy moth project.

Experience and Education: Experience as Forest Health Specialist since 1974 and experience in gypsy moth management since 1977. M.F., Duke University in Forest Entomology and Pathology; B.A., Catawba College in pre-forestry.

Angela Rust, SW Nursery Inspector and Compliance Officer, Division of Entomology and Plant Pathology, Indiana Department of Natural Resources, 145 24th Street, Tell City, Indiana 47586.

EA Responsibility: Participated in writing and reviewing the environmental assessment and in consultation of the proposed cooperative gypsy moth project.

Experience and Education: Nursery Inspector and Compliance Officer with the Indiana Department of Natural Resources, Division of Entomology and Plant Pathology since 1995. B.S., Purdue University in Entomology.

6.0 LIST OF PERSONS AND AGENCIES CONSULTED

Eric Biddinger, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

Eric Bitner, Nursery Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

Kallie Bontrager, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

J. Matthew Buffington, Environmental Supervisor, IDNR Division of Fish and Wildlife, 402 West Washington Street, Room 273W, Indianapolis, IN 46204. Consultation on treatment sites and proposed project.

Vince Burkle, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

Ken Cote, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

Subrahmanyam Darbha, Forest Entomologist, IDNR Division of Forestry, 402 West Washington Street, Room 296W, Indianapolis, IN 46204. Consultation on treatment sites.

James Glass, Director, IDNR Division of Historic Preservation and Archaeology, 402 West Washington Street, Room W274, Indianapolis, IN 46204. Consultation on historical properties of concern.

Dennis Haugen, Forest Entomologist, USDA Forest Service, Forest Health Protection, 1992 Folwell Ave., St. Paul, MN 55108. Consultation on treatment sites and proposed project.

Scott Kinzie, Nursery Inspector and Compliance Officer, IDNR Entomology and Plant Pathology, 402 West Washington Street, Room 290W, Indianapolis, IN 46204.
Consultation on treatment sites and proposed project.

Donna Leonard, Entomologist, STS Coordinator, USDA Forest Service, FHP, P.O. Box 2680, Asheville, NC 28802. Consultation on treatment sites.

Scott Pruitt, Field Supervisor, US Fish and Wildlife Service, 718 North Washington Street, Bloomington, IN 47404. Consultation on threatened and endangered species.

Zack Smith, Forest Entomologist, IDNR Forestry, 402 West Washington Street, Room 296W, Indianapolis, IN 46204. Consultation on treatment sites and development of cooperative project.

Christie Stanifer, Environmental Coordinator, Environmental Unit, IDNR Division of Fish and Wildlife, 402 West Washington Street, Room 264W, Indianapolis, IN 46204. Consultation on treatment site and proposed project.

7.0 REFERENCES CITED

- Glare, T.R. and M. O'Callaghan. 2000. *Bacillus thuringiensis*: Biology, Ecology and Safety. John Wiley & Sons, Ltd. New York, 350 pp.
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- USDA. 1996. Gypsy Moth Management in the United States: A Cooperative Approach. Record of Decision. USDA-Forest Service and USDA-APHIS.

APPENDIX A. ISSUES, QUESTIONS AND CONCERNS FROM THE PUBLIC MEETING

At the public meeting (Table 1), representatives from the Division of Entomology and Plant Pathology presented the proposed gypsy moth project, and answered questions and received comments. The presentation explained:

- the life cycle, feeding habits and hosts of gypsy moth,
- the identification of gypsy moth,
- survey methods,
- gypsy moth impacts and damage to the trees and forest,
- selection of proposed sites,
- selection of the treatment options,
- the timing and application of treatments,
- boundaries of the treatment sites with maps and photos.

Following the presentation and during the presentation, questions and comments were taken, answered and discussed with the people attending the meeting.

Table 1: Date, time and attendance of the Public Meeting for the proposed treatment sites.

COUNTY	SITE	DATE	TIME	# Attending
Delaware	Nebo	January 17, 2008	6:30 PM EST	9
Scott	Crothersville	January 23, 2008	6:00 PM EST	3

SUMMARY OF QUESTIONS AND COMMENTS

The response from the public meeting was positive. There were no negative comments expressed. The questions and comments received at the public meetings concerned four main issues:

- Human health and safety;
- Non target effects and environmental effects;
- Economic and political impacts;
- Likelihood of success of the proposed project and the treatment options proposed.

ISSUES

Human Health and Safety

Questions regarding Btk application and effects included: How long does Btk persist? When will the application take place? Is Btk harmful to people or pets?

Responses stated that: Btk applications (two applications) will likely occur in late April or early May, but the timing depends on weather conditions and gypsy moth larval development. Btk targets the larval (caterpillar) stage of the insect. Btk persists for about 3-7 days and cannot effectively be used within 24 hours of rainfall. People and pets are not

normally affected by Btk; however, it is possible that a person or animal could be sensitive to the product and have minor skin or nasal irritations after the treatment. A question was asked whether or not the DNR would mail out notifications a couple weeks prior to the treatment and the response was given that yes, all affected residents would be notified and that treatments usually occur early in the morning. Local news media would also be notified a couple days prior to the treatment date.

Non target and Environmental Effects

Concerns were expressed over the impacts of Btk on native lepidopterans (butterflies and moths) and it was stated that Btk is applied at a time of the year prior to when most species of native butterfly or moth larva are present. Proposed treatment areas are also checked for the known presence of any endangered butterfly species prior to being treated.

Economic and Political Impacts

No questions were asked in this subject area.

Likelihood of Success of the proposed project and the proposed treatment options

No questions were asked in this subject area.

Other Questions or Concerns

Several general questions were asked regarding the treatment site history (regarding the Crothersville proposed site), what homeowners should be doing, and general treatment questions.

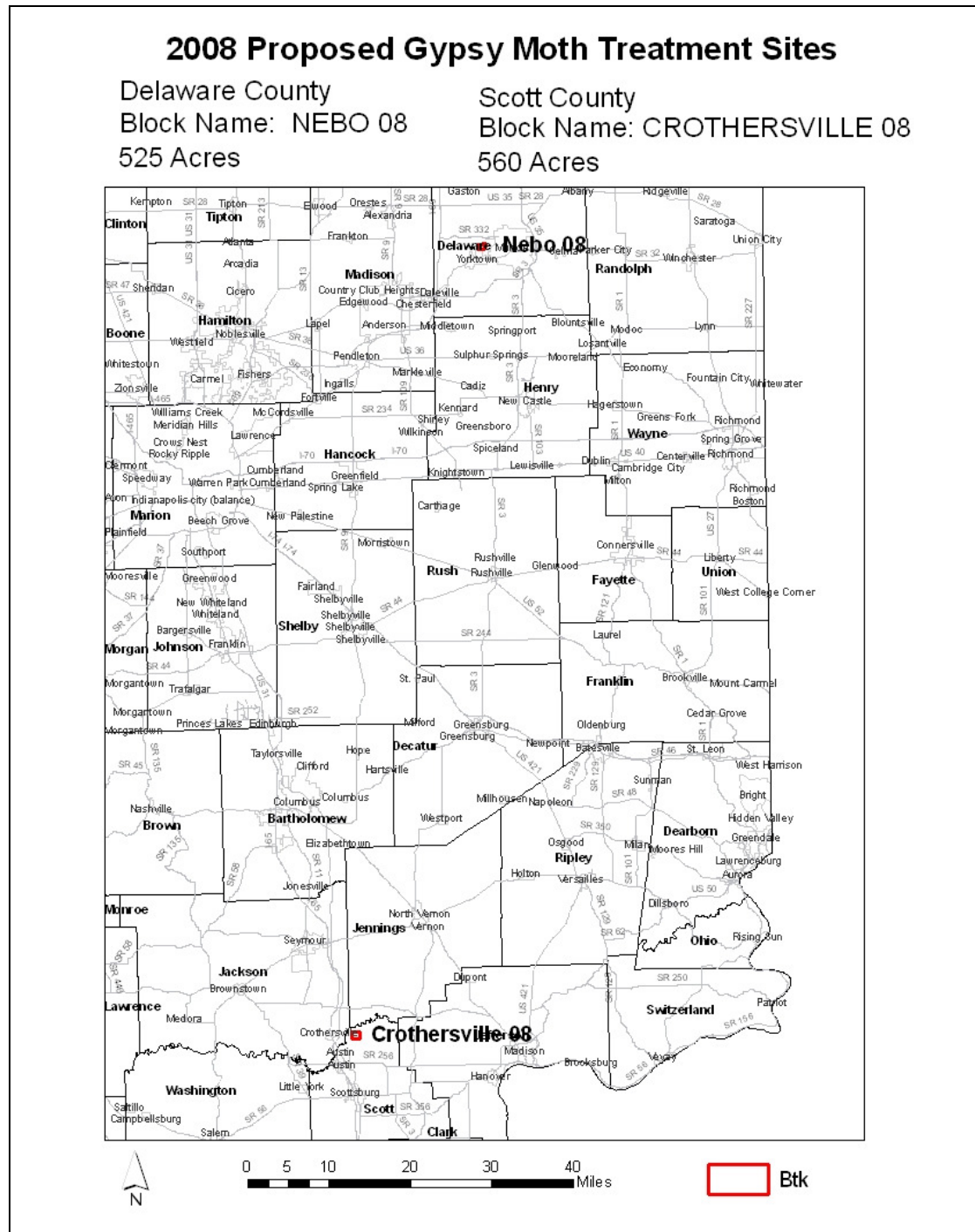
Gypsy moth populations were discovered at the proposed treatment site at Crothersville in 2002. The population was artificially introduced into the area through movement of people. The site was then treated in 2004 with mating disruption. Traps were placed in the area to monitor populations after the treatment. Populations were found again in 2005, including egg masses and the site was then treated with Btk in 2006. The site was monitored again in 2006 and 2007. In 2006, gypsy moth was not detected in the treatment site indicating a successful treatment. In 2007, actionable levels of population were detected and egg masses were found in the boundaries of the 2006 treatment site. and so Btk is proposed for 2008.

It was recommended that homeowners be proactive in checking their trees for egg masses and other signs of gypsy moth and if gypsy moth is thought to be found, then the homeowner should contact the DNR for identification and management options. The question was asked as to why a homeowner might not want this treatment, and it was responded that even though we are not sure why some homeowners would not want the treatment, some individuals may still have concern. Several attendees stated that they were in favor of the Btk treatments and asked if they should send in positive comments and it was stated that they should.

APPENDIX B. MAPS OF THE PROPOSED TREATMENT SITES

COUNTY	SITE NAME	TREATMENT	MAP TYPE	PAGE
Delaware	Nebo	Btk	Topographic	25
Scott	Crothersville	Btk	Topographic	26

Btk = *Bacillus thuringiensis* var. *kurstaki* with two aerial applications.

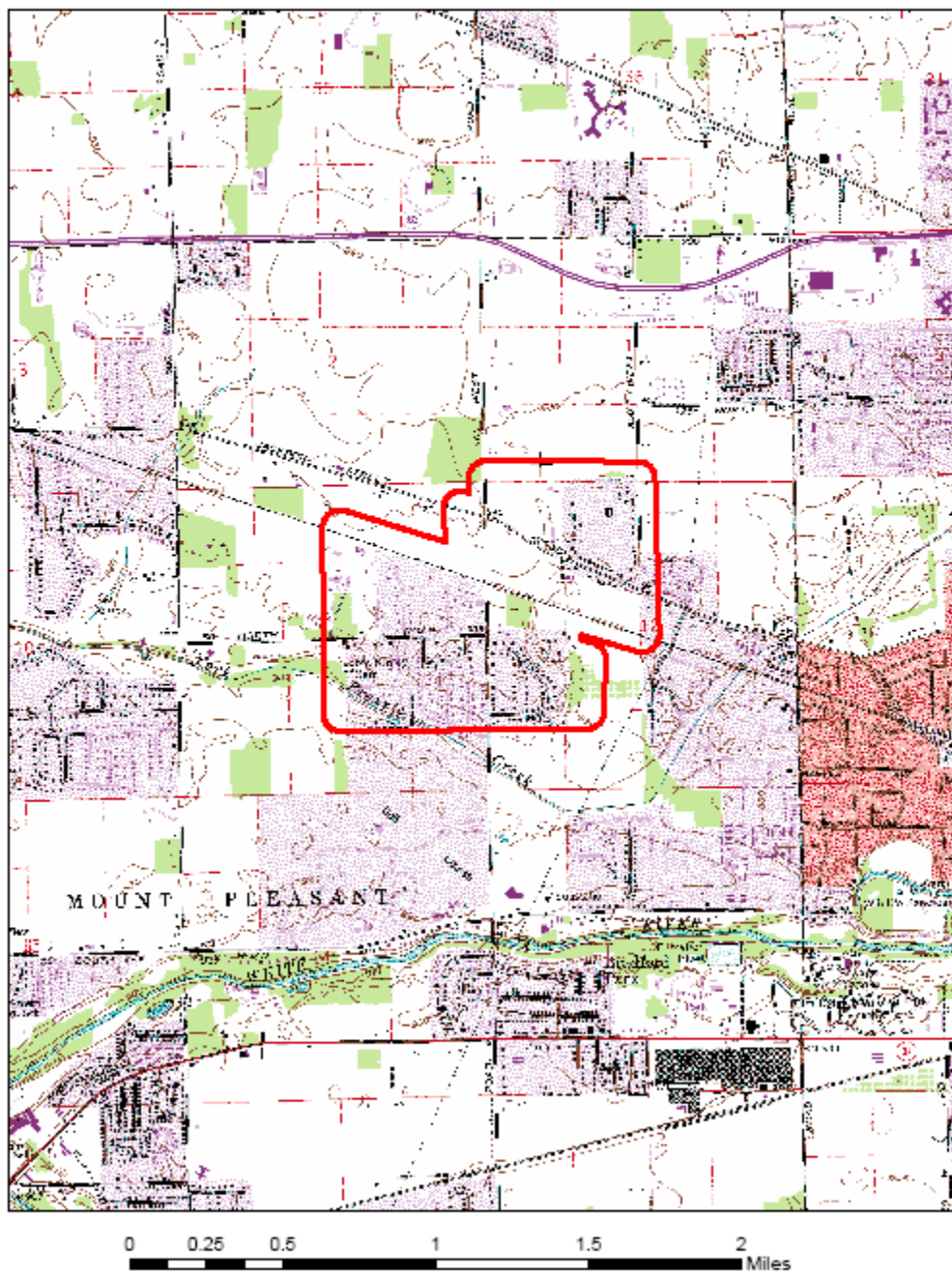


Proposed Gypsy Moth Treatment Site

Delaware County

Block Name: Nebo 08

525 Acres; Btk

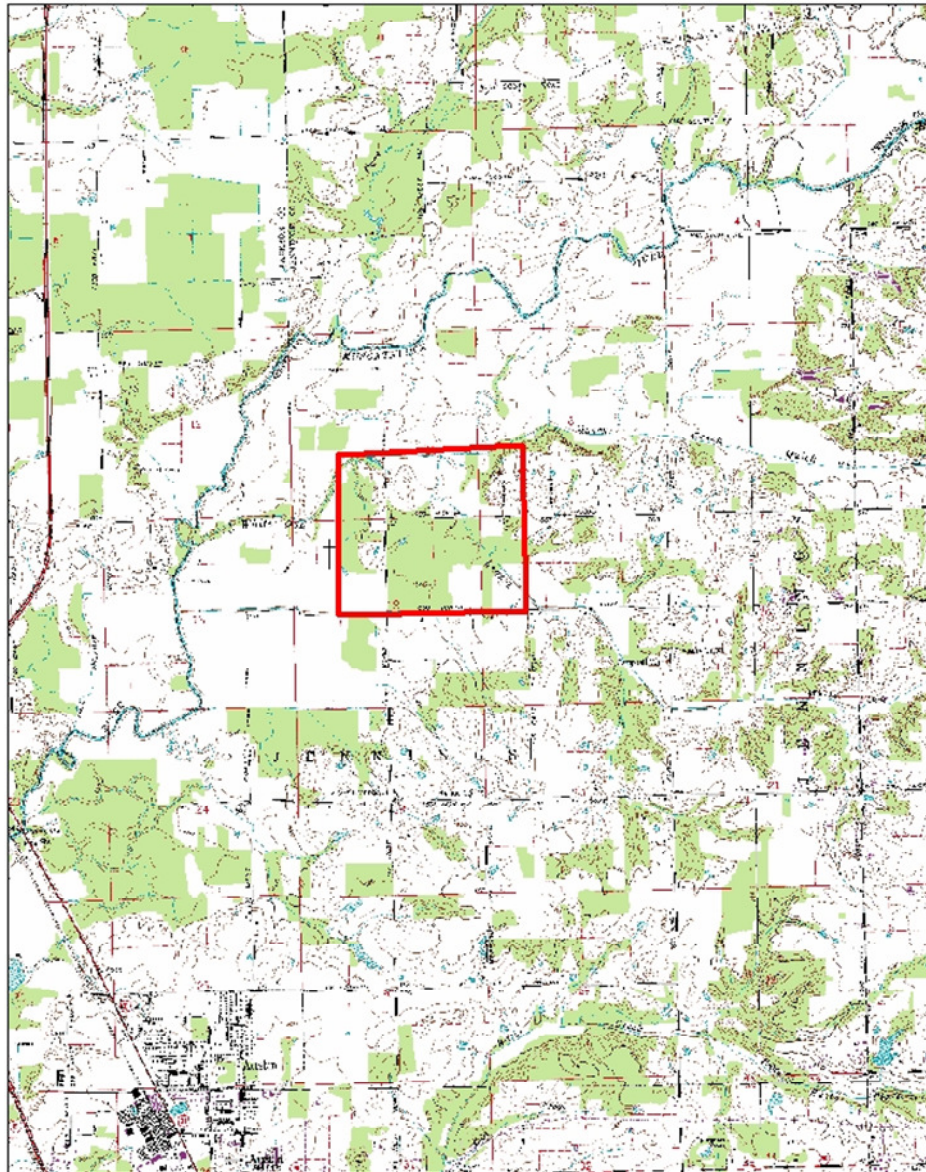


Proposed Gypsy Moth Treatment Site

Scott County

Block Name: Crothersville 08

560 Acres; Btk



0 0.25 0.5 1 1.5 2 Miles

APPENDIX C. AGENCY LETTERS



United States Department of the Interior Fish and Wildlife Service



Bloomington Field Office (ES)
620 South Walker Street
Bloomington, IN 47403-2121
Phone: (812) 334-4261 Fax: (812) 334-4273

January 18, 2008

Mr. Philip Marshall
Indiana DNR, Division of Entomology and Plant Pathology
402 West Washington Street, Room 290
Indianapolis, Indiana 46204

Dear Mr. Marshall:

The U.S. Fish and Wildlife Service (FWS) has reviewed your letter of December 19, 2007 regarding the 2008 gypsy moth treatment program for 17 sites in 7 Indiana counties (Allen, Delaware, Elkhart, Lake, LaPorte, Scott, St. Joseph). We are submitting the following comments on the 2008 program.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969, the Endangered Species Act of 1973, and the U. S. Fish and Wildlife Service's Mitigation Policy.

The plan submitted in your letter includes aerial spraying of mating disruption pheromone flakes (Disrupt II) at 2 sites (8795 acres total) and aerial spraying of *Bacillus thuringiensis* biological control (Btk) at 15 sites (8617 acres), all with federal funding assistance.

Endangered butterflies

One of the proposed treatment methods, spraying with *Bacillus thuringiensis* (Bt), is of concern for 2 federally endangered species of Lepidoptera in Indiana, the Karner blue butterfly (*Lycaeides melissa samueulis*) and Mitchell's satyr butterfly (*Neonympha mitchelii*). The known occurrences of these 2 endangered species are in the northern portions of Lake and Porter Counties (Karner blue butterfly), and isolated locations in LaPorte and LaGrange Counties (Mitchell's satyr). The range of these species has not changed since our review of the 2007 gypsy moth program. Neither species is known to occur near any of the Btk sites identified in your letter. Treatment with Disrupt II pheromone flakes, which is considered to be highly specific for gypsy moths, will have no adverse impacts on the federally listed butterflies.

Other Endangered Species

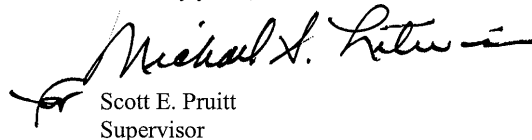
The proposed treatment sites are within the range of the federally endangered Indiana bat (*Myotis sodalis*). Indiana bats hibernate in caves, then disperse to reproduce and forage in relatively undisturbed forested areas associated with water resources during spring and summer. Young are raised in nursery colony roosts in trees, typically near drainageways in undeveloped areas. Prior to hibernation, Indiana bats feed intensively in forested areas near hibernacula in order to build up adequate fat reserves to survive hibernation.

The diet of Indiana bats consists entirely of insects. Based on previous studies they appear to be somewhat opportunistic feeders. Some studies have found lepidopterans as a major dietary component, while others found a diet dominated by terrestrial Coleopterans or aquatic insects. Most of these studies were essentially "snapshots" and there is a lack of comprehensive, long-term research. It is possible that under some circumstances extensive elimination of a broad range of lepidopteran species over a large habitat area has the potential to adversely affect the food base of an Indiana bat nursery colony. This concern increases greatly with the use of Dimilin because it kills a much broader range of insects. None of the proposed treatment areas are near Indiana bat hibernacula. All of the 2008 Btk aerial treatment sites are limited to relatively small areas of Indiana bat summer habitat. Therefore the FWS concludes that the federally assisted 2008 gypsy moth program is not likely to adversely affect any of these federally listed species.

This precludes the need for further consultation on this project as required under Section 7 of the Endangered Species Act of 1973, as amended. If, however, new information on endangered species at the site becomes available or if project plans are changed significantly, please contact our office for further consultation.

For further discussion, please contact Mike Litwin at (812) 334-4261 ext. 205.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Michael S. Pruitt", with a stylized flourish at the end.

Scott E. Pruitt
Supervisor

cc: Christie Keifer, Indiana Division of Fish and Wildlife, Indianapolis, IN
USFWS, Chesterton, IN



Indiana Department of Natural Resources

Division of Historic Preservation & Archaeology • 402 W. Washington Street, W274 • Indianapolis, IN 46204-2739
Phone 317-232-1646 • Fax 317-232-0693 • dhpa@dnr.IN.gov

Mitchell E. Daniels, Jr., Governor
Robert E. Carter, Jr., Director



January 9, 2008

Philip T. Marshall
Managing State Entomologist and Forest Health Specialist
Indiana Department of Natural Resources, Division of Entomology and Plant Pathology
402 West Washington Street, Room W290
Indianapolis, Indiana 46204

State Agency: Indiana Department of Natural Resources, Division of Entomology and Plant Pathology

Re: Project information concerning the gypsy moth treatment sites for 2008 (DHPA #3439)

Dear Mr. Marshall:

Pursuant to Indiana Code 14-21-1-18 the Indiana Department of Natural Resources, Division of Historic Preservation and Archaeology ("DHPA") has conducted a review of the materials dated and received by the DHPA on December 19, 2007, for the above indicated project in Allen, Delaware, Elkhart, Lake, LaPorte, Scott, and St. Joseph Counties, Indiana.

Based on our analysis, we do not believe that any historic properties will be altered, demolished, or removed by the proposed project.

If you have any further questions regarding this determination, please contact the DHPA. Questions pertaining to this project should be directed to Holly Tate at (317) 234-3919 or htate@dnr.IN.gov. Additionally, in all future correspondence regarding the above indicated project, please refer to DHPA #3439.

Very truly yours,

James A. Glass, PhD
Director, Division of Historic Preservation & Archaeology

JAG:HAT:hat

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THIS IS NOT A PERMIT

**State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water**

Early Coordination/Environmental Assessment

DNR #:	ER-13067-1	Request Received: December 19, 2007
Requestor:	Indiana Department of Natural Resources Philip T. Marshall Division of Entomology & Plant Pathology 402 W. Washington Street Rm W290 Indianapolis, IN 46204	
Project:	2008 Proposed Gypsy Moth Treatment Sites (additional sites)	
County/Site info:	Allen - Delaware - Elkhart - Lake - LaPorte - Scott - St. Joseph Counties The Indiana Department of Natural Resources has reviewed the above referenced project per your request. Our agency offers the following comments for your information and in accordance with the National Environmental Policy Act of 1969.	
Regulatory Assessment:	Formal approval by the Department of Natural Resources under the regulatory programs administered by the Division of Water is not required for this project.	
Natural Heritage Database:	The Natural Heritage Program's data have been checked. The following comments are separated by treatment block (County): Allen - Arlington Park: Mengerson Nature Preserve (NP) is located ¼ mile west of the block. The Division of Nature Preserves (DNP) recommends application with a southwest wind. - St. Joe 08: Mengerson NP is located south of block. DNP recommends application with southwest wind. Lake - Oak Ridge: Oak Ridge Prairie County Park is located within the treatment block, and Hoosier Prairie NP is located just west of the block. Given the importance of both of these natural areas, which contain multiple rare insects, we support the use of pheromone flakes. LaPorte - Beatty Corner: Little Calumet Headwaters NP is located approximately 1 mile southeast of the treatment block, but we do not anticipate any impacts from the treatment. - Springfield 08: Springfield Fen NP, which contains rare insects, is located approximately 1/2 mile east of the Btk treatment area. DNP recommends an application with an east or south wind. Otherwise, the Division supports the use of pheromone flakes in the vicinity of this important natural area. St. Joseph - Quince Rd: There is a wet prairie natural area located east and across the lake from the treatment block. DNP recommends an application with an east or south wind.	

THIS IS NOT A PERMIT

**State of Indiana
DEPARTMENT OF NATURAL RESOURCES
Division of Water**

Early Coordination/Environmental Assessment

Fish & Wildlife Comments: The impacts of this gypsy moth control effort are impossible to predict. However, the devastating effects of uncontrolled gypsy moth infestations are well documented. Effects on non-target species are possible and care should be taken near areas that could possibly possess endangered or threatened species, or species of concern. The effects on target species will depend on a variety of factors and are impossible to predict with certainty. However, controlling the spread of this species is important to reduce the negative effects the caterpillars have on trees, particularly oaks. At this time, no harm to state or federal listed species resulting from the proposed control measures is known or anticipated. The potential harm from the project is less than the potential harm to these same species from an uncontrolled gypsy moth infestation.

The US Fish and Wildlife Service will provide their own comments regarding the impacts to federally listed species, especially the Karner Blue (*Lycaeides melissa samuelis*) and Mitchell's Satyr (*Neonympha mitchellii mitchellii*) butterflies that occur within counties to receive treatment.

Contact Staff:

Christie L. Stanifer, Environ. Coordinator, Environmental Unit
Our agency appreciates this opportunity to be of service. Please do not hesitate to contact the above staff member at (317) 232-4160 or 1-877-928-3755 (toll free) if we can be of further assistance.



J. Matthew Buffington
Environmental Supervisor
Division of Fish and Wildlife

Date: January 22, 2008

APPENDIX D. EXAMPLE OF PRODUCT LABEL

SPECIMEN LABEL

UPDATES AVAILABLE AT WWW.GREENBOOK.NET 1

Valent BioSciences

Foray® 76B

Biological Insecticide

Flowable Concentrate

For the control of Lepidopterous Larvae

ACTIVE INGREDIENT:

Bacillus thuringiensis subspecies *kurstaki*, strain

ABTS-351, fermentation solids and solubles 18.44%

Other Ingredients: 81.56%

Total: 100.0%

Potency: 16,700 Cabbage Looper Units (CLU)/mg of product (equivalent to 76 billion CLU/GAL.).

The percent active ingredient does not indicate product performance and potency measurements are not federally standardized.

EPA Reg. No. 73049-49

EPA Est. No. 33762-1A-001

LIST NO. 60176

KEEP OUT OF REACH OF CHILDREN

CAUTION

1.0 FIRST AID

If on skin or clothing	<ul style="list-style-type: none">• Take off contaminated clothing.• Rinse skin immediately with plenty of water for 15-20 minutes.• Call a poison control center or doctor for treatment advice.
If in eyes	<ul style="list-style-type: none">• Hold eye open and rinse slowly and gently with water for 15-20 minutes.• Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.• Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER	
Have the product container with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-877-315-9819 for emergency medical treatment and/or transport emergency information. For all other information, call 1-800-323-9597.	

2.0 PRECAUTIONARY STATEMENTS

2.1 HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION

Causes moderate eye irritation. Avoid contact with eyes, skin, or clothing. Wash thoroughly with soap and water after handling.

2.2 Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt
- Long pants
- Waterproof gloves
- Shoes plus socks

2.3 Agricultural Use Requirements:

Mixers/loaders and applicators must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic reactions. When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

2.4 Non-Agricultural Use Requirements:

Mixer/loaders and applicators not in enclosed cabs or aircraft must wear a dust/mist filtering respirator meeting NIOSH standards of at least N-95, R-95, or P-95. Repeated exposure to high concentrations of microbial proteins can cause allergic sensitization.

2.5 User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling the product. Wash outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

2.6 Environmental Hazards

For terrestrial agricultural uses, do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

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Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

3.0 STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal of waste.

Storage: Store in a cool, dry place. Keep containers tightly closed when not in use. Store in temperatures above freezing and below 25°C (77°F).

Pesticide Disposal: Pesticide waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility in accordance with federal and local regulations.

Container Disposal: Triple rinse (or equivalent). Then offer for recycling or reconditioning or puncture and dispose of in a sanitary landfill or by incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

4.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Do not apply this product through any type of irrigation system.

5.0 AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Waterproof gloves
- Shoes plus socks

6.0 APPLICATION

Foray 76B may be applied by ground or aerial equipment undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected. The amount of water needed per acre will depend upon crop size, weather, spray equipment, and local experience.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower/treatment coordinator are responsible for considering all of these factors when making decisions.

7.0 MIXING

Shake or stir Foray 76B before use. Fill spray or mixing tank half full of water. Begin agitation and pour Foray 76B into water while maintaining continuous agitation. Add other spray material (if any) and balance of water. Agitate as necessary to maintain suspension. Do not allow diluted mixture to remain in the tank for more than 72 hours.

The use of a spreader-sticker approved for use on growing crops is recommended for hard to wet crops such as cole crops or to improve weather-fastness of the spray deposits. Combinations with commonly used spray tank adjuvants are generally not deleterious to Foray 76B, if the mix is used promptly. Before mixing in the spray tank, it is advisable to test physical compatibility by mixing all components in a small container in proportionate quantities.

8.0 SPRAY VOLUMES

Ground Application: Use recommended amount of Foray 76B in ground equipment with quantities of water sufficient to provide thorough coverage of plant parts to be protected. The amount of water needed per acre will depend upon crop size, weather conditions, spray equipment used and local experience.

Aerial Application: Use recommended amount of Foray 76B in aerial equipment undiluted or with quantities of water sufficient to provide thorough coverage of plant parts to be protected. In the western US 5-10 gallons per acre is the normal minimum; in the eastern regions a minimum of 2-3 gallons is normally used. The minimum amount of water needed per acre will depend upon crop size, weather conditions, spray equipment used and local experience.

9.0 GENERAL AGRICULTURAL USE INSTRUCTIONS

Foray 76B is a biological insecticide for the control of lepidopterous larvae. It contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 76B must be ingested by the larvae to be effective. For consistent control, apply at first sign of newly hatched larvae (1st and 2nd instar larvae). Susceptible larvae that ingest Foray 76B cease feeding within a few hours and die within 2-5 days.

Foray 76B may be applied up to and on the day of harvest.

For maximum effectiveness the following is recommended:

Monitor fields to detect early infestations.

Apply Foray 76B when eggs start hatching and larvae are small (early instars) and before significant crop damage occurs. Larvae must be actively feeding to be affected.

Repeat applications every 3 to 14 days to maintain control and protect new plant growth. Factors affecting spray interval include rate of plant growth, weather conditions, and reinfestations. Monitor populations of pests and beneficials to determine proper timing of applications.

Under conditions of heavy pest pressures or when large worms are present use the higher rate, shorten the application interval, and/or improve spray coverage to enhance control. When these conditions are present, a contact insecticide should be used to enhance control.

Thorough coverage is essential for optimum performance. Ground applicators equipped with directed drop nozzles can improve coverage.

10.0 Table 1.

Crop	Pets	Rate ¹ (oz./acre)	Dosage ¹ (BIU/acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Ornamental Fruit, Nut & Citrus Trees ²	Gypsy Moth Elm Spanworm	13.5-67.5	8-40
	Spruce Budworm Browntail Moth Douglas Fir Tussock Moth Coneworm Buck Moth	13.5-50.5	8-30
	Tussock Moth Pine Butterfly Bagworm Leafroller Tortrix Mimosa Webworm Tent Caterpillar Jackpine Budworm Blackheaded Budworm Saddled Prominent Saddleback Caterpillar Eastern & Western Hemlock Looper Orangestriped Oakworm Satin Moth	10.0-27.0	6-16
	Redhumped Caterpillar Spring & Fall Cankerworm California Oakworm Fall Webworm	7.0-13.5	4-8

Special Instructions

¹Use the higher recommended rates on advanced larval stages or under high density larval populations.

²In treating gypsy moth infested trees and shrubs in urban, rural, and semi-rural areas, exposure of non-target vegetation including, but not limited to, native and ornamental species and food or feed crops is permitted.

11.0 DIRECTIONS FOR USE FOR NON-AGRICULTURAL APPLICATIONS

11.1 NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries or greenhouses.

Keep unprotected persons out of the treated areas until sprays have dried.

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment- and weather-related factors determine the potential for spray drift. The applicator and the grower/treatment coordinator are responsible for considering all of these factors when making decisions.

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Not for use on plants being grown for sale or other commercial use, or for commercial seed production, or for research purposes. For use on plants intended for aesthetic purposes or climatic modification and being grown in interior landscapes, ornamental gardens or parks, or on golf courses or lawns and grounds.

Not for use on trees being grown for sale or other commercial use, or for commercial seed production, or for the production of timber or wood products, or for research purposes except for wide-area public pest control programs sponsored by government entities, such as mosquito abatement, gypsy moth control, and Mediterranean fruit fly eradication.

Do not apply this product through any type of irrigation system.

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Foray 76B contains the spores and endotoxin crystals of *Bacillus thuringiensis kurstaki*. Foray 76B is a stomach poison and is effective against lepidopterous larvae. After ingestion, larvae stop feeding within hours and die 2-5 days later. Maximum activity is exhibited against early instar larvae. Foray 76B may be used for both ground and aerial application. The product should be shaken or stirred before use. Add some water to the tank mix, pour the recommended amount of Foray 76B into the tank and then add the remaining amount of water to obtain the proper mix ratio. Agitate as necessary to maintain the suspension. The diluted mix should be used within 72 hours.

11.2 Ground Application:

Use an adequate amount of tank mix to obtain thorough coverage without excessive run off. Use the recommended per acre dosages of Foray 76B in up to the following amounts of water:

High volume hydraulic sprayers	100 gallons
Mist blowers	10 gallons

11.3 Aerial Application:

Foray 76B may be applied aerially, either alone or diluted with water at the dosages shown in the application rates table. Spray volumes of 28-128 ounces per acre are recommended. Best results are expected when Foray 76B is applied to dry foliage.

12.0 Table 2.

Crop	Pets	Rate ¹ (oz./acre)	Dosage ¹ (BIU/acre)
Forests, Shade Trees, Ornamentals, Shrubs, Sugar Maple Trees, Ornamental Fruit, Nut & Citrus Trees ²	Gypsy Moth Elm Spanworm	13.5-67.5	8-40
	Spruce Budworm Browntail Moth Douglas Fir Tussock Moth Coneworm Buck Moth	13.5-50.5	8-30
	Tussock Moth Pine Butterfly Bagworm Leafrollers Tortrix Mimosa Webworm Tent Caterpillar Jackpine Budworm Blackheaded Budworm Saddled Prominent Saddleback Caterpillar Eastern & Western Hemlock Looper Orangestriped Oakworm Satin Moth	10.0-27.0	6-16
	Redhumped Caterpillar Spring & Fall Cankerworm California Oakworm Fall Webworm	7.0-13.5	4-8

Special Instructions

¹Use the higher recommended rates on advanced larval stages or under high density larval populations.

²In treating gypsy moth infested trees and shrubs in urban, rural, and semi-rural areas, exposure of non-target vegetation including, but not limited to, native and ornamental species and food or feed crops is permitted.

13.0 NOTICE OF WARRANTY

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE CONCERNING THE USE OF THIS PRODUCT OTHER THAN AS INDICATED ON THE LABEL. USER ASSUMES ALL RISK OF USE, STORAGE OR HANDLING NOT IN STRICT ACCORDANCE WITH ACCOMPANYING DIRECTIONS.

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